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5. Preserving fruitfly larvae.
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Lead arsenate in soil.

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ENTOMOLOGY AND PLANT QUARANTINE

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR OCTOBER 1935

Vol. II, No. 12 (Not for publication) December 1, 1935

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS MADE PART OF FRUIT INSECTS DIVISION

Effective November 19, the research work on Japanese and Asiatic beetles, originally carried on as an independent unit reporting direct to the Chief of Bureau, was transferred to and made a part of the Division of Fruit Insect Investigations. This transfer of activities was made because it was not considered good administration for a laboratory to report direct to the Chief of Bureau. The transfer is not intended in any sense as a criticism of the work that has been done or a subordination of the work on the Japanese and Asiatic beetles nor does it mean any demotions or changes in personnel in connection with the work on Japanese and Asiatic beetles.

MUESEBECK HEADS DIVISION OF INSECT IDENTIFICATION

On October 31 C. F. W. Muesebeck succeeded Harold Morrison as leader of the Division of Identification and Classification of Insects. Mr. Muesebeck has been associated with this division as assistant leader and is recognized as one of the highest authorities on parasitic wasps. He has made many important contributions on the classification and habits of these parasites.

Carl Heinrich, well known for his work on adults and larvae of microlepidoptera, has been selected as assistant leader.

Dr. Morrison, who has been in immediate charge of the division since July 1, 1928, will resume his studies on the identification and classification of scale insects, a group on which he is recognized as one of the world's leading authorities.

PROCUREMENTS

Every month the Bureau administrative offices in Washington receive a number of inquiries from the field concerning orders previously placed for supplies and equipment. Even without these reminders, the business offices are painfully aware that too often a period elapses between the placing of an order and the receipt of the goods, which must seem unreasonably long to the field men waiting for the supplies. Based on the standards and practices of a few years ago, such delays would be rather unusual. Prior to the emergency conditions of the past 4 or 5 years, each bureau in the Department maintained a shelf stock of the articles most commonly needed in its operations, and when requests were received from the field it was a comparatively simple matter to pack the necessary supplies and get them off within 2 or 3 days. Likewise, when it was necessary to place an outside purchase order for supplies or materials, the volume of business in relation to the personnel of the purchasing offices was not too large to prevent the immediate handling of the order.

Two major changes have come about which make it impossible to maintain former practices: First, the tremendous increase in the volume and complexity of procurements in the Bureau; and second, the centralization, both in the Department and in the Government service as a whole, of the purchase of ordinary supplies.

As to the increase in business, the Bureau Purchasing Office handled during the 6-month period ended September 30, 1935, approximately 5,000 procurement transactions, all of which involved the preparation of at least one set of papers and many of which included the making up of specifications and other operations of a highly technical nature. In addition to the paper work required, the handling of these transactions necessitated numerous telephone calls and personal contacts with business concerns and with other Government agencies; and at the same time it was essential for the purchasing office to maintain its acquisition and property records, keep the flow of vouchers from vendors moving, and check property returns. It can readily be appreciated that the handling of more than 30 procurement orders a day would be no small task, even if the Bureau were in a position to proceed with the orders directly, without clearance through any other agency. This, however, is not the case, as a large proportion of purchases necessitate contacts with the Central Supply Section of this Department and with the Procurement Division of the Treasury Department. This factor is mentioned with no desire to reflect unfavorably on the centralized purchasing procedure, which has undoubtedly effected economies in the procurement of some types of material. The inevitable effect, however, has been to slow up appreciably the purchasing business of the Government, as it is clearly impossible for any central purchasing unit to anticipate demands that may be placed upon it with sufficient accuracy to have on hand or readily available all the materials it may be called upon to furnish. This situation has been made more difficult by the demands placed upon the purchasing machine by the various new emergency agencies that necessarily had to start from the very beginning in their procurement programs. These demands have in many instances required the negotiation of contracts far in excess of those anticipated at the beginning of the fiscal period, and the burden of work has sometimes made it impossible for the requisitioning departments to obtain up-to-date advice regarding the current contracts on even staple items. In a number of cases the Bureau has been entirely dependent on telephone information as a basis for drawing its requisitions for many items included in the general schedule of supplies but on which no printed schedules were available.

The business offices have no desire to lay the blame for delays entirely at the door of the centralized purchasing system, but the existing situation does involve factors of delay that the average man in the field naturally does not understand and for which he is likely to hold his headquarters' office responsible. Everyone concerned, both in the Department and in the Procurement Division, is doing his best to expedite purchasing transactions, but it is to be expected that certain delays will continue to occur and requisitions from the field should be submitted with that in mind. Although it is obvious that unexpected emergency needs will arise, a little advance estimating will eliminate many requests of the type now submitted on an emergency basis. For example, it is difficult to see why the need for such items as pencils, paper clips, and notebooks cannot be anticipated in time to place the order well in advance of the exhaustion of the current supply.

Two specific complaints with regard to procurements from the Central Supply Section of the Department are so widespread as to deserve special mention. The first is the failure of the present stock list to include prices. The quoting of prices in such a list is not an easy matter. The supply of goods on hand at the beginning of the period covered by one of these lists is practically certain to be exhausted before the list gets into the hands of the field organization and several replenishments on each particular item will, no doubt, be necessary before a new list is issued. There is no assurance that prices will remain constant. At the same time, it has been pointed out to the Central Supply Section that the bureaus, and particularly the men in the field who have to keep within a rather limited allotment, are entitled to some information at the time they place an order as to what the materials will cost. The Central Supply Section has agreed, therefore, to include in its next stock list, which will come out about January 1, a list of estimated prices, with the understanding that the prices are simply the best estimate that can be made and are not guaranteed in any specific instances, although over the group there should be no large variation. This list will be helpful to men in the field in determining not only what the items will cost but whether it is economical to buy them through the Central Supply Section. If the local price on the item is lower than that listed in the catalog, it would clearly be in the interest of the Government for the purchase to be made locally.

The second complaint relates to the frequent necessity for back ordering and the difficulty in keeping track of back-ordered material. It is common for a field station to order half a dozen items and to receive shipment containing only four items, with the notation on the enclosed requisition copy that the other two are out of stock but will be back ordered. On receipt of such a notice, the field man wonders whether he should reorder the material and how he will know, when he gets it, that it represents shipment on the previous order and not delivery on some new order that may have been placed. The answer to the first question is that it will not be necessary to reorder, as the Central Supply Section automatically places the back order on items it cannot fill on the current requisition. If the need for this material is so urgent that the field office cannot wait for supplemental shipment, it can of course make local purchase in sufficient quantity to meet immediate needs. As to the second question, with every back order shipped there is enclosed a copy of the Central Supply Section's back order, indicating on its face that this shipment is a back order and giving the number of the original requisition. Through the use of this requisition number there should be no difficulty in checking up the order originally placed.

The field man's "Bible", with regard to purchasing, might include the following commandments: (1) Place orders as far as possible in advance of your ordinary needs. (2) Order in sufficient volume to avoid the placing of numerous small requests, which multiply paper work and increase shipping costs. (3) If it is impossible to order items by stock, catalog, or other identification number, give as full a description as possible of the items desired and indicate any known source of supply. This will materially aid in the handling of the order. (4) Limit emergency requests to real emergencies that cannot be anticipated in time to handle procurements through the normal procedure. On the other hand, if a real emergency does arise, do not hesitate to order any items needed, explaining the circumstances so that the Bureau may determine whether or not there is justification for proceeding without competition in case the amount of purchase exceeds $50. (5) Give the Bureau and the Department the benefit of any doubt as to whether or not your order is being handled as promptly as circumstances will permit. The Washington office is just as anxious as is the field organization to have procurements handled promptly, and when delays occur they are, in nine cases out of ten, due to some condition over which the Bureau has no control. (6) When inquiring as to delayed orders, give a specific description of the original order. This is particularly necessary for a large station that may have several similar orders in the process of being handled at the same time. (7) Do not hesitate to make to the Bureau any suggestions that you think would be helpful in improving purchasing procedure and practices. While it may not be possible to adopt your idea because of laws or administrative policies, suggestions from men actually in the field are always welcome and many of them have proved very helpful.

The foregoing discussion applies primarily to regular activities. Procurements on W. P. A. projects are handled largely through the regional offices of the Procurement Division. When W. P. A. orders are delayed, the matter should be taken up with the regional office handling it. If results cannot be obtained in that way, the Bureau will make inquiries of the Procurement Division in Washington.

FRUIT INSECT INVESTIGATIONS

A second generation of the peach borer.--This season Oliver I. Snapp and J. R. Thomson, of the peach-insect laboratory at Fort Valley, Ga., found that with a small proportion of the population of this insect two generations may occur in 1 year. Nursery stock was artificially infested on July 15 and 17 and moths emerged from these trees on September 30, having completed their larval, prepupal, and pupal periods in a total of 75 days. All of the second-generation adults reared were undersized. Fertile second-generation eggs were laid by these moths. Although a few moths emerged from normal nursery stock, most of this emergence may have been forced by a lack of food. It is not known whether any peach borer adults emerged the same year the larvae hatched, from orchard trees under normal orchard conditions.

Phenothiazine for codling moth control.--Preliminary reports on the results obtained with phenothiazine in the control of the codling moth have been received from E. J. Newcomer, in charge of the Division's field laboratory at Yakima, Wash. The data obtained are as follows:

Orchard	Lead arsenate 3-100			Phenothiazine 4-100		
	Apples			Apples		
	Per box	Wormy	Stung	Per box	Wormy	Stung
	Number	Percent	Percent	Number	Percent	Percent
Villmann------	70	14.0	40.0	85	5.6	2.1
Harrington---	97	8.1	37.7	112	3.6	1.8
Ewer----------	144	10.0	30.3	166	3.9	1.2
Average----	104	10.7	36.0	121	4.4	1.7

The fruit on the trees sprayed with phenothiazine was somewhat smaller than that on the trees sprayed with lead arsenate. There was a slight difference in color, the ground color being a deeper green and there being somewhat less red than on fruit sprayed with lead arsenate. A pressure test showed 17.4 pounds for apples sprayed with phenothiazine and 17.0 pounds for apples sprayed with lead arsenate. No injury was evident on the Rome variety nor on the few Jonathans or the Winter Nelis pears. Two Winesap trees and a few Delicious trees in one orchard showed a little marginal foliage injury. The fruit on the Winesaps was quite small.

Preservation of fruit fly larvae.--James Zetek, Panama Canal Zone, reports that he has tested methods of preservation and has found a very successful one for preserving fruit fly larvae, which is as follows: Living larvae are kept in water until ready to be fixed. To nine parts of water, add one part of saturated, aqueous solution of picric acid, bring to the boiling point, decant the water from the vessel containing the larvae, and pour in the hot picric acid-water solution. Leave the larvae in the fixing solution until it cools (about 1 hour). Decant fixing fluid from the larvae, wash them several times in tap water, and preserve in a 70-percent solution of ethyl alcohol. The picric acid tints the larvae a pale yellow. The color makes the spiracles stand out sharply and is of advantage in photographing the larvae. If the alcohol becomes yellow it should be decanted from the specimens and fresh alcohol should be added. If the pale-yellow color is not desired, hot water can be used as a fixing solution instead of the picric acid solution.

Population studies of Japanese beetle in areas of early infestation.--Henry Fox, Moorestown, N. J., states that, as in other years, the area of continuous infestation exhibits local accelerations in its general outward expansion, owing to its meeting and fusing with certain secondary areas of spread near its periphery. The main local infestations instrumental in enlarging the area of continuous infestation were those developed in the general vicinity of New York City and Brooklyn; at Reading and Lancaster in Pennsylvania; between Havre de Grace and Aberdeen, Md.; and at Dover, Del. In 1935 the area of continuous infestation was estimated to occupy approximately 11,400 square miles, distributed by States as follows: New Jersey, 6,460; Pennsylvania, 3,100; Delaware, 670; Maryland, 480; New York, 690. This is a total increase of 1,700 square miles within the year.

Field study of milky disease.--S. R. Dutky, Moorestown, reports that in May 1935 field test plots were established near Shiloh, N. J., to determine the possibility of artificially disseminating the milky disease of Japanese beetle larvae in the spring. A survey during the fall of 1934 failed to reveal any indication of the milky disease in the vicinity where the plots were established. During May 3,000 healthy third-instar larvae collected from this region were injected with a saline suspension of the spores of the causal organism. The inoculated larvae were then used to infest the test plots. On October 14, 1935, the plots were examined and out of a total of 621 larvae collected, 25, or 4 percent, showed the milky disease.

Experimental infection of larvae with fungous disease.--S. R. Dutky, Moorestown, states that when healthy larvae were dusted with the spores from a fungous culture isolated from diseased larvae collected in the field, and then placed in tightly stoppered shell vials, humidified with moist cotton plugs, and held at 86° F., they developed brown lesions in the cuticula and died within 3 days. As the vials contained no soil or other ingestible material, it is likely that the spores penetrated either by way of the spiracles or directly through the cuticula. Among undusted larvae used as controls there was no mortality for a week. Larvae placed in vials containing soil inoculated with fungous spores likewise developed the fungous disease, while larvae placed in vials containing uninoculated soil were alive and healthy after 12 days. Spores from another fungous culture isolated from field-infected Japanese beetle pupae produced infection in both third-instar Japanese beetle larvae and third-instar larvae of Autoserica castanea Arrow, and similarly fungous spores from cultures isolated from Autoserica pupae produced infection in third-instar larvae of both Japanese beetle and Autoserica. There are slight cultural differences between the two organisms, especially in the readiness of sporulation.

Penetration of lead arsenate in New Jersey soils.--A study has been completed by W. E. Fleming, F. E. Baker, and L. Koblitsky, all of Moorestown, of the penetration of lead arsenate into three New Jersey soils. The purpose of this study was to determine the relationship between penetration of lead arsenate in different soil types and its toxicity to grubs. A series of studies was conducted at Moorestown from 1929-1932 on sassafras sandy loam, Penn shale loam, and Lakewood sand, the insecticide being applied at depths of 3, 6, and 12 inches. When lead arsenate was applied at a depth of 3 inches there was a slow loss of arsenic from the surface layer of the sassafras sandy loam and the Penn shale loam, and no significant difference in the rate of loss in these soils. The loss from the surface layer of the Lakewood sand was practically twice as rapid as in the other soils. When the arsenate was applied at depths of 6 and 12 inches in the sassafras sandy loam and in the Penn shale loam, a balance was established between the surface layer and the lower layers and there was a definite tendency of the arsenic to accumulate at the surface. Lakewood sand had little ability to retain lead arsenate and there was no indication of arsenic accumulating at the surface. It seems logical to think of arsenic fixation in soils as a change from the soluble to the relatively insoluble forms, and the establishment of a slowly changing equilibrium in which there is a tendency for the more soluble or more readily available forms to change to the less soluble and less available forms. As the power to fix arsenic is undoubtedly associated with the amount of the finer separates, namely, silt, clay, and colloidal matter in the soil, such types of soil as Lakewood sand, which are practically lacking in these constituents, naturally have a low fixing power for arsenic. In the soil of commercial nurseries in New Jersey there is a tendency for the arsenic to establish a balance between the surface and the lower layers and to become fixed to a large extent in the surface layer. No injury occured to smartweed plants growing on sassafras sandy loam or Penn shale loam, even when there was a significant increase of arsenic in the surface layer by migration from the lower layers. Plants on the Lakewood sand were severely injured by arsenic, in spite of the rapid reduction in the concentration of the material in the surface layer. The concentration of soluble arsenic in the soil is a more reliable index of arsenic toxicity to plants than is the concentration of total arsenic in the soil.

Protection of truck crops from injury by the larvae.--F. E. Baker, Moorestown, reports that the vegetables planted in soil treated with paradichlorobenzene during the summer of 1935 have been harvested. Tomatoes, eggplants, and sweetpotatoes, although retarded in growth when first planted, produced normal crops when dosages of 200, 400, and 600 pounds per acre were applied, even when planted on the day of treatment. The yield of lettuce was decreased with all dosages where this crop was planted immediately after the soil treatment. When planting was delayed 5 and 12 days, respectively, the lettuce produced proportionately more in the treated plots, but still showed a decreased yield with all dosages. Carrots were practically killed in soil containing 400 and 600 pounds of paradichlorobenzene per acre, and the harvest was considerably decreased in soil containing 200 pounds per acre, not only when planted on the day of treatment but also when planted 5 days later. When planting was delayed for 12 days the only significant decrease in yield was obtained in the 600-pound plot. The yield of onions was decreased in the 200-pound plot, and this vegetable also failed to grow in the 400- and 600-pound plots when planted on the day of treatment. The plantings made on the 5th and 12th days after treatment failed to grow in the untreated plot, therefore they had to be disregarded.

Absorption of arsenic by forest-tree seedlings.--W. E. Fleming, F. E. Baker, and L. Koblitsky, Moorestown, report that in determining the quantity of arsenic absorbed by nursery plants growing in plots treated with lead arsenate, the roots and tops of various seedlings grown in soils treated with lead arsenate at concentrations ranging from 500 to 1,500 pounds per acre, were analyzed for arsenic. The seedlings were planted in pots in the greenhouse in December 1934. The pots were plunged outdoors in the spring of 1935. They were taken up for analysis in September, and the arsenic assimilated in parts As_2O_3 per million by the various varieties is shown in the following table.

Seedling	Soil	Parts As_2O_3 per million after treatment with $PbHAsO_4$ per acre					
		500 lbs.		1,000 lbs.		1,500 lbs.	
		Tops	Roots	Tops	Roots	Tops	Roots
Pinus caribaea	Clayton, N. C.	12.93	78.80	19.90	97.30	24.83	99.30
Do	Clayton, N. C. + 10% cow manure	11.08	63.00	12.33	95.00	15.66	67.00
Do	Georgetown, S. C.	16.25	78.75	18.75	79.37	20.93	93.75
Do	Georgetown, S. C. + 10% cow manure	20.00	73.75	31.25	81.75	31.25	87.50
Do	Camden, S. C.	27.18	98.33	35.67	101.66	35.93	118.33
Do	Camden, S. C. + 10% cow manure	33.75	65.00	26.66	96.16	45.83	100.00
Do	Moorestown, N. J.	7.50	28.00	23.10	60.00	31.25	72.50
Do	Moorestown, N. J. + 10% cow manure	15.65	60.87	16.90	89.00	18.15	93.75
Pinus jeffreyi	Moorestown, N. J.	23.80	75.00	26.30	96.30	31.20	143.80
Pinus ponderosa	do.	31.21	62.49	43.82	83.33	32.33	162.50

MEXICAN FRUIT FLY

Fruit shipments from lower Rio Grande Valley.--The fruit-shipping season opened on October 10. By the end of the month 506 cars had been shipped by rail and 172 equivalent carloads had moved by truck. Oranges constituted only 5 percent of the total.

Fruit flies trapped.--Twenty-two adult *Anastrepha ludens* Loew were trapped on 21 premises in the valley in October. Other *Anastrepha* spp. were trapped as follows: *A. pallens* Coq., 178; *A. serpentina* Wied., 11; *A. fraterculus* auct., 8. Although intensive inspection was made on all properties on which fruit flies were trapped, no fruit was found infested.

DATE SCALE CONTROL

No scale found.--During October a number of palms in the High School, Indio Heights, and West Side districts in the Coachella Valley, Calif., were inspected and no scale was found. The Indio Heights and High School districts are now considered free from scale and no further work is contemplated. No more inspection will be necessary in the West Side district, but infested properties and properties where valueless palms have been dug out will be checked for volunteer plants. In the Imperial Valley the Reed Garden was inspected from ground and ladders and no scale was found. During the inspection all bushy palms were pruned. No scale has been found on this property since February 1934. Scouting for unlisted palms was continued.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Notes on parasites of wheat insects.--C. C. Hill, Carlisle, Pa., reports that *Pleurotropis benefica* Gahan, the most important parasite of the black grain stem sawfly (*Trachelus tabidus* Fab.) in the United States, was recovered this summer in Lima, Ohio, by E. J. Udine. *P. benefica* is fairly abundant in the eastern half of Pennsylvania but has failed to keep pace with the rapid increase in numbers of its host in western Pennsylvania and eastern Ohio, where its presence was doubted until the recovery was made at Lima. *Heterospilus cephi* Rohwer, the principal American parasite of a wheat-stem sawfly, *Cephus pygmaeus* Linn., has been steadily increasing its range of distribution, along with its host. It was recovered this year for the first time from Cumberland, Lancaster, and Bucks Counties, Pa. In that State it had previously been found only in Lycoming County. Rearings of hessian fly material from points in Jefferson County, N. Y., show a distinct northern limit of effective parasitization by *Platygaster zosine* Walk. Extensive rearings showed from 0 to 0.31 percent parasitization by this species in that locality, as compared with an average of 20 percent parasitization farther south in the State.

Pea aphid in Pacific Northwest.--L. P. Rockwood, of the Forest Grove, Oreg., laboratory, reports that on October 17 and 18, alfalfa fields and sweetclover on ditch banks near Toppenish and Mabton in the Yakima Valley, Wash., were swept for aphids by L. P. Rockwood and Max M. Reeher. Aphids were moderately abundant but were all one species, namely, *Illinoia pisi* Kalt. The same was true in the Walla Walla Valley, Wash., and in the Columbia Valley in east-central Oregon. It is remarkable that no *Illinoia creelii* (Davis) was found in these localities, particularly in the Yakima Valley.

Unrecorded host plants of I. creelii (Davis).--A few years ago Sadie E. Keen, formerly of the Forest Grove, Oreg., laboratory, found *I. creelii* on several leguminous host plants that have never before been recorded in the literature. The records were all made in western Oregon, especially in the seacoast region. These hosts are:

Lathyrus sp., Forest Grove, Oreg., June 14, 1923; Portland, Oreg., June 19, 1923; May 24, 1924; and June 9, 1926.
Lathyrus maritimus, Seaside, Oreg., June 25, 1923; May 8, 1924; October 29, 1925; October 28, 1926.
Lathyrus littoralis, Seaside, Oreg., June 25, 1923; October 29, 1925.
Lathyrus sulphureus, Forest Grove, Oreg., April 14, 1928.
Trifolium fimbriatum, Seaside, Oreg., October 27, 1923.
Vicia americana, Seaside, Oreg., May 8, 1924; October 29, 1925.
Alsike clover, Seaside, Oreg., October 29, 1925.
White clover, Seaside, Oreg., October 29, 1925.
Red clover, Seaside, Oreg., October 29, 1925.

Control of corn borer by varietal characteristics.--L. H. Patch and G. T. Bottger, of the Toledo, Ohio, laboratory, report as follows: "It appears that a reduction of about 40 percent of the borer population could be effected by planting corn of later maturity, and a reduction of about 25 percent could be effected by planting corn in which eclosion of the tassel is delayed. By planting corn that takes full advantage of the growing season in the locality concerned (generally of later maturity), and which has been bred for delayed-tassel eclosion, it appears that reductions up to 35 or 40 percent in the borer populations could be effected."

European corn borer reduces yield of sweet corn seed.--Morris Schlosberg and Ralph Mathes, Toledo, Ohio, report results based on data obtained in 1934 from experiments conducted with five varieties of sweet corn near Toledo. Each variety was tested independently at four different rates of borer population in the plants laid in four-fold replication in a Latin square. The reductions of usable sweet corn seed per acre per borer per plant are given in the following table.

Variety	Mid-silk date	Yield in absence of borers	Reduction per borer per plant	
		Pounds per acre	Pounds per acre	Percent
Purdue Bantam----------	July 21	1,783.7 ± 125.9	56.8 ± 13.2	3.8 ± 0.74
Stowell's Evergreen--	July 28	1,741.2 ± 83.9	80.6 ± 21.3	4.63 ± 1.22
Late Mammoth----------	August 4	1,672.7 ± 81.2	103.4 ± 22.0	6.18 ± 1.32
Bantam Evergreen------	July 30	1,566.2 ± 43.3	106.5 ± 9.9	6.80 ± 0.63
Country Gentleman----	July 31	1,668.1 ± 54.7	139.5 ± 21.4	8.36 ± 1.28
Generalized result for all varieties--	----------	1,628.6 ± 37.1	74.2 ± 6.8	4.56 ± 0.42

JAPANESE BEETLE CONTROL

Soil poisoning completed in St. Louis and Indianapolis.--Application of lead arsenate to two new Japanese beetle infestations in St. Louis, begun on August 8, was completed on October 8. From September 27 until completion of the work, the spraying was done with labor supplied by the State. Approximately 100 acres were sprayed at the rate of 1,000 pounds of lead arsenate per acre. On October 9 application of the insecticide to the soil in areas outside of the treated section in Indianapolis in 1934 was begun. Two Federally owned sprayers were shipped to Indianapolis from the New Cumberland warehouse and the two that had been in St. Louis were driven to Indianapolis. In addition to an extension of the area treated in 1934, two other points of infestation were sprayed. Approximately 20 tons of lead arsenate were applied at the rate of 1,000 pounds per acre. Labor for the Indianapolis project was furnished by the F. E. R. A.

Many azaleas treated with paradichlorobenzene.--During a 10-day period in mid-October, approximately 7,200 azaleas were treated by the recently approved paradichlorobenzene method.

Temporary inspectors added to gypsy moth force.--Owing to increased inspection demands, it has been necessary to employ 19 temporary inspectors. No evidence of gypsy moth infestation has been found in the Connecticut nurseries inspected. Twenty-seven lots of evergreen boughs in southern Vermont and 6 in western Massachusetts have been inspected with negative results. It is estimated that approximately 1,000 tons of evergreen boughs will be cut and baled on the lots that have thus far been inspected.

Gypsy moth road inspection started.--Funds for the maintenance of a gypsy moth vehicular road patrol were recently made available from the emergency appropriation for gypsy moth control. Twelve stations--3 in Massachusetts and 9 in Connecticut--are scheduled for operation over a period of 7 months.

Evergreen inspection starts in New England.--Cutting of evergreen boughs and Christmas trees was under way by the middle of October in the northern sections of New England. Five temporary inspectors were hired on October 14 and assigned to evergreen-bough inspection in Vermont. On the same date one inspector was assigned to the inspection of evergreen wreath material at a large processing plant at Westminster, Vt.

First-record corn borer infestations.--Corn borer scouting performed during October with W. P. A. funds resulted in the finding of first-record infestations in 89 towns and townships in 5 States. Twelve towns in York County, Maine, were found infested for the first time. In New Jersey first-record infestations were discovered in 1 township each in Atlantic, Camden, Cape May, and Sussex Counties, 2 townships each in Middlesex, Monmouth, Salem, and Passaic Counties, 3 townships in Hunterdon County, 4 townships each in Morris and Warren Counties, 12 townships in Bergen County, and 17 townships in Burlington County. Michigan first-record infestations comprise 6 townships in Allegan County, 2 in Berrien County, 8 in Ottawa County, and 3 in Van Buren County. In Wisconsin first-record finds were made in 5 townships in Manitowoc County. With the last-named record, infestations have been found in the entire County of Manitowoc. One first-record find was recorded in Northampton County, Va. The regular town survey work was completed early in October in New Hampshire, Vermont, Rhode Island, and Connecticut. Special surveys were then started throughout New England.

Dutch elm disease eradication.--Confirmation was received of a third Dutch elm diseased tree at Brunswick, Md. All known confirmed trees in Connecticut have been eradicated. At the end of October there were only 38 confirmed trees standing in the entire area and most of these were recent confirmations on which State officials had not obtained permission for eradication.

FOREST INSECT INVESTIGATIONS

Inventory of pine beetle damage nears completion.--F. P. Keen, of the Portland, Oreg., laboratory, reports that the first general survey of western pine beetle damage in Oregon and Washington was undertaken this fall in cooperation with the Forest Service. Five crews of three men each, employed by the Forest Service early in August, covered 3,000,000 acres of National Forest and private pine lands by the middle of October. Counts were made of beetle-killed trees on 2,000 miles of strip, and careful analyses were made of insect damage on 102 320-acre plots. Similar surveys were made by the Indian Service of the pine forests on Indian reservations of the two States. Technical supervision of these surveys was provided by the Bureau of Entomology and Plant Quarantine and the work of compiling the data is now nearing completion at the Portland laboratory.

Douglas fir bark beetle active in northern Washington.--Mr. Keen states that during the annual fall survey of check plots on the Chelan National Forest, group killing by Dendroctonus pseudotsugae Hopk. was prevalent. Infestation is of two types. The first and more normal type is confined to the poor sites where numerous trees are dying as the result of mistletoe, flatheaded borer, and Douglas fir bark beetle activity, usually a combination of the three. The second and more serious situation is found along the stream bottoms in sites where relatively large groups of good quality Douglas fir are being killed. These infestations are practically all caused by D. pseudotsugae and, in all observed cases, they center around firs that had been broken by snow or wind.

Parasites of hemlock sawfly may be used against European spruce sawfly.--R. L. Furniss, Portland, reports that an extensive infestation of Neodiprion tsugae Middleton has been present on western hemlock in central Oregon for the past 3 years. Heavy defoliation occurred in 1934 but this was very considerably reduced in 1935 by the activity of several species of parasites. Itoplectis montana Cush., normally parasitic on lepidopterous pupae, was found to be particularly effective. Some 7,800 sawfly cocoons were collected in September and forwarded to the New Haven, Conn., forest-insect laboratory. Fall emergence of parasites was at its height at the time of shipment. The life history and habits of the parasites are to be worked out to determine whether any can be used against the European spruce sawfly (Diprion polytomum Htg.) which has recently become very destructive in the Northeastern States and Canada.

Melrose Highlands laboratory moved to New Haven.--R. C. Brown reports that during the month the laboratory dealing with introduced forest insects was moved from 1156 Main St., Melrose Highlands, Mass., to 56 Hillhouse Ave., New Haven, Conn. The building at New Haven was formerly the residence of President Dwight of Yale University. It has been offered rent-free by the University for use as station headquarters and laboratories for the forest-insect investigations in the Northeast. The Forest Service and the Division of Forest Pathology, of the Bureau of Plant Industry, are occupying similar residences in New Haven, also owned by Yale University.

European spruce sawfly.--H. J. MacAloney, New Haven, reports: "Two examinations of the plantations of the New Haven Water Company at Wepawaug Reservoir, Orange, Conn., were made in October--one the first week and the second on October 21. On the latter date the thin appearance of the branches, caused by feeding of the European spruce sawfly, was noticeable. The collection of early stage larvae on October 21 suggests the possibility of more than two generations of this species in Connecticut. This is further suggested by the fact that flies emerged on October 23 from cocoons collected at Kent, Conn. On October 25 these flies began laying eggs, which hatched in 5 days. One hundred cocoons from Grand Cascapedia, Quebec, have been placed in jars, with soil and litter added, in a constant-temperature room at the Agricultural Experiment Station."

Sawfly on red pine.--J. V. Schaffner, Jr., reports regarding *Neodiprion* sp., which defoliated 12 acres of red pine in June at Marlboro, Mass., that emergence of adults had practically ceased by the end of October. It is of interest to note that the males outnumbered the females by about 12 to 1. This is explained by the fact that the female larvae feed over a longer period than do the males, and that complete defoliation occurred just before the majority of the female larvae matured; also, a lead-arsenate spray was applied on the trees that were not completely defoliated, just before the larvae reached maturity. The larvae of this sawfly feed during May and June, at a time before the current year's growth has progressed very far. Thus practically all of the feeding is confined to the old needles. This apparently explains the fact that no mortality of pines has occurred at Marlboro in 1935.

Experiments with parasites of hemlock sawfly.--P. B. Dowden, New Haven, reports: "On September 30 a collection of 7,896 *Neodiprion tsugae* Middleton (hemlock sawfly) cocoons, made at Sweet Home, Oreg., on September 24, 25, and 26, arrived at this laboratory. The cocoons were sent by F. P. Keen in order that we might obtain the parasite *Itoplectis montanae* Cush. and experiment with it as a parasite of *D. polytomum*. The cocoons arrived in excellent condition and both host and parasite adults started issuing immediately. Up to the present the following adults have been recovered: *N. tsugae*, 929; *I. montanae*, 759 (334 males, 425 females); *Hemiteles tenellus* (Say), 50; *Thysiotorus* sp., 29; cryptine (two spp.), 18; chalcidoid, 40; tachinid, 7. *I. montanae* readily attacks exposed *D. polytomum* cocoons, laying a large internal egg in the overwintering larva. Development of the early larval instars of the parasite has been noted, and a total of 1,007 cocoons have been attacked at the laboratory. Unfortunately, the parasite does not seem to seek out unexposed cocoons. *D. polytomum* forms its cocoon in the forest litter. When these conditions were simulated by covering 10 cocoons with about 1/4 inch of dead spruce needles, not a single cocoon was attacked.

The larch sawfly and its parasites.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that early in October 4,000 larch sawfly (*Lygaeonematus erichsonii* Htg.) cocoons were collected from the infested area on the North Fork of the Flathead River, Mont., and shipped to R. C. Brown, New Haven, Conn., for rearing. This project is being conducted to determine the species of parasites already present, as well as the percentage of parasitization in 1935, this information being essential in planning for the institution of biological control.

The satin moth in Washington.--R. T. Webber is now stationed at the Morristown, N. J., laboratory, after having spent a portion of the year investigating the status of the satin moth in Washington and Oregon, with headquarters at Puyallup. Four species of hymenopterous parasites and one tachinid fly parasite were included in the introductions of the past several years. Apanteles solitarius (Ratz.) and Meteorus sp., had become established and the Apanteles, especially, had spread over a large part of the territory infested by the satin moth. From collections of satin moth caterpillars made this year numbers of the tachinid Compsilura concinnata Meig. were obtained, and Mr. Webber also found that another of the hymenopterous parasites, Eupteromalus nidulans (Thomson), an enemy of the hibernating caterpillars, has become established.

Dispersion of elm bark beetles.--R. R. Whitten, Morristown, is conducting an experiment to obtain information on the dispersion of the elm bark beetles Scolytus multistriatus Marsh. and Hylurgopinus rufipes (Eich.) in an elm-free area in New Jersey. Elm wood infested with the two species was placed at a central point, and freshly cut noninfested elm logs were put at various distances on lines radiating from this point, to act as trap logs for beetles emerging from the infested material. In a preliminary report on this experiment, Mr. Whitten states that H. rufipes adults have been found boring into trap logs 1/2 mile from the central point.

Repellents of elm bark beetles.--Mr. Whitten and W. C. Baker, Morristown, report on an experiment in which elm logs were sprayed with various mixtures which, it was thought, might repel the smaller European bark beetle (S. multistriatus) and which might be used to prevent such logs from acting as breeding places. After the logs were sprayed, they were exposed to attack by the beetles. The materials used were: Coal-tar creosote and fuel oil, 1-3 by volume; cresol and fuel oil, 1-3; pyridine and fuel oil, 1-3; paradichlorobenzene dissolved in fuel oil; and lime-sulphur concentrate and water. No mixture gave complete protection, but the results obtained with coal-tar creosote and fuel oil and with cresol and fuel oil show that these materials, at least, merit further study.

Control of Douglas fir beetle.--Artificial control measures were instituted in September to combat an epidemic of the Douglas fir beetle (Dendroctonus pseudotsugae Hopk.) within the Douglas fir stands of the Cody Canyon, Shoshone National Forest, Wyo. This project will be continued throughout the winter, the labor being supplied from a winter C. C. C. camp located in the center of the infested area.

GYPSY AND BROWN-TAIL MOTH CONTROL

Emergency labor aids in moth control.--Up to October 15, 1935, under the W. P. A. emergency projects, the following numbers of workers were employed under the gypsy moth project in the different States: Maine, 43; New Hampshire, 43; Vermont, 314; Massachusetts, 392; Rhode Island, 69; Connecticut, 448; New York, 158; New Jersey, 73; Pennsylvania, 707; total, 2,247. On the same date, under the W. P. A. emergency project, the numbers employed on brown-tail moth work were as follows: Maine, 38; New Hampshire, 80; Massachusetts, 242; total, 360. During the last week in September over 1,600 men from C. C. C. camps were employed on gypsy moth work in the area east of the barrier zone, this being the highest number recorded up to that time. During 1 week in September over 72,000 new gypsy moth egg clusters, most of which were in Massachusetts, were creosoted by C. C. C. men. This indicates the intensity and the seriousness of the infestation, especially in the Massachusetts towns, which are located between Worcester County and the Connecticut River.

PLANT DISEASE CONTROL

Blister rust found in Lagrange County, Ind.--Blister rust was found on Ribes cynosbati and R. americanum in Lagrange County on September 20 by R. A. Sheals, of the Division of Domestic Plant Quarantines, and F. F. Franklin, of the Division of Plant Disease Control. Specialists of the Division of Forest Pathology of the Bureau of Plant Industry, who examined a specimen of this find, have verified the identification of the disease as the white pine blister rust. This makes two infected counties in Indiana, infection having been reported in September in La Porte County.

W. P. A. workers engaged in blister rust control.--In the week ended November 2, 4,401 W. P. A. workers were employed on blister rust control work throughout 28 States. Of this number 4,057 were from relief rolls and 344 nonrelief. The Ribes-eradication season has been completed for this year in some sections of the country, owing to the defoliation of the plants and the appearance of snow and freezing weather. In other sections Ribes eradication will continue as long as field conditions permit effective work.

Spread of blister rust in Maryland.--An examination of blister rust infected areas in Maryland indicates that the rust first became established on native white pines about 1924 in Garrett County. Since then it has been spreading to other counties but, owing to the 3-year incubation period of the fungus on white pines, the extent of its distribution on white pines is only now becoming apparent. Within the last 3 years 17 pine-infection centers have been found, ranging from a few trees to 25 acres in extent. Eleven of these centers are located in Garrett County, 4 in Allegany, 1 in Washington, and 1 in Frederick. Infection on Ribes has been found in 1 location in Montgomery County, 2 in Frederick, 2 in Washington, and 5 in Allegany, while in Garrett County it is found to be generally distributed, about 60 percent of the Ribes that were eradicated in control areas this fall being infected.

COTTON INSECT INVESTIGATIONS

Hemipterous insects on cotton in Arizona, summer of 1935.--Horace G. Johnston, employed for 3 months last summer, has reported on the relative abundance of species, seasonal distribution, host relationships, and other similar factors affecting the hemipterous-insect populations of cotton fields in Arizona. Forty-four species of hemipterous insects were collected. At least 15 of these species, either directly or indirectly, affect cotton production. They were divided according to their feeding habits into the boll-feeding group, the square- or bud-feeding group, and the predators. The boll-feeding group includes in order of their importance the following: Euschistus impictiventris Stahl., Chlorochroa sayi Stahl., Thyanta custator

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Fab., Dysdercus mimulus Hussey, Euryophthalmus succinctus Linn., and Chlorochroa ligata Say. The square-feeding group includes 5 species of Miridae which, in the order of their importance, are: Lygus hesperus Knight, Psallus seriatus Reut., Parthenicus sp., Creontiades femoralis Van D., and Rhinacloa forticornis Reut. Corizus lateralis Say and C. hyalinus Fab. are probably responsible for injury to large squares just before blooming, causing a proliferation of cells, deformed corolla lobes, and a growth of yeast within the deformed blooms which destroys the stamens and anthers. The 5 most abundant predators were: Geocoris sonoraensis Van D., Nabis ferus Linn., Zelus socius Uhler, Zelus renardi Kolo., and Orius insidiosus Say. All of the important species of hemipterous insects were at least equally as abundant in the Yuma Valley as in the Buckeye Valley. P. seriatus and D. mimulus were not found in the Parker area and none of the other species were abundant in this area. In the Safford area D. mimulus, E. succinctus, Lygus pratensis oblineatus Say, and C. femoralis were not found on cotton. C. sayi and T. custator were quite abundant in some fields in this area, but the other species were quite scarce. P. seriatus was practically absent in cotton fields, although it was extremely abundant on Croton texensis nearby. C. ligata was more abundant here than elsewhere. Average populations in the Tucson area were even smaller than in the Safford area. Conditions were much the same as at Safford, especially in regard to P. seriatus. The life histories of E. impictiventris, C. sayi, and T. custator were studied for the purpose of identifying the egg and nymphal stages. The entire cycle of E. impictiventris required a minimum of 31 days, a maximum of 49 days, and an average of 40 days. C. sayi required a minimum of 42 days, a maximum of 65 days, and an average of 53 days. T. custator required a minimum of 32 days, a maximum of 42 days, and an average of 37 days. The life-history studies were made under rather unfavorable conditions, with the maximum temperature averaging nearly 103° F. and the minimum around 66.5°. Eggs of these 3 species were collected to determine the percentage of parasitization. Of 761 eggs of E. impictiventris, 54 percent were parasitized by Telenomus n. sp. Of 659 eggs of C. sayi, 46.9 percent were parasitized by Telenomus mesillae Ckll. Of 227 eggs of T. custator, 35.3 percent were parasitized by T. mesillae. The percentage parasitized in the field was probably considerably higher than these records indicate. Work was started too late in the season to determine seasonal importance of all the wild host plants. Information obtained in June, July, and August indicated that for C. sayi, the weed Atriplex semibaccata R. Br., which grows abundantly on canal banks and around alfalfa fields, is the most important host. Eggs, nymphs, and adults were found on this plant. Malva parviflora L. was the next most important species but is less favorable as a host than Atriplex. For the cotton flea hopper, Sphaeralcea emoryi variabilis (Cockl.) Kearney is the most important host in this region during the early part of the season. It occurs more or less abundantly throughout the State on sandy soils in abandoned fields, canal banks, roadsides, and washes. Most of the plants reach maturity and die by the middle of June but some plants in favorable locations remain partially green and continue to bloom all summer. Croton texensis (Klotzsch) furnishes an abundant food supply for flea hoppers during midsummer and autumn. It occurs rather abundantly in the eastern part of the State, becoming more abundant toward the northeastern part. It grows primarily on sandy soils and is seldom found on the heavier soils near streams. Only a small number of plants were found along the Gila River near Buckeye. Malva parviflora is the most important host plant of D. mimulus. Nymphs and adults were found abundantly on this weed, especially in alfalfa fields or other places where the ground is partially shaded. The prostrate habits of the plant make it especially suitable for the nymphs, which prefer to remain on or near the ground. Sphaeralcea emoryi variabilis (Cockl.) Kearney is also an important host plant of Corizus lateralis Say in the early part of the season. Both nymphs and adults were found abundantly on it. Other wild hosts of less importance were found for several of the insects. Determinations of Hemiptera were verified by H. G. Barber, determinations of the egg parasites Telenomus spp. were made by C. F. W. Muesebeck, and the plants were determined by R. O. Peebles, of the Bureau of Plant Industry at Sacaton, Ariz.

Tests for boll weevil control at Tallulah, La.--R. C. Gaines, M. T. Young, and G. L. Garrison report unsatisfactory and erratic results from boll weevil control test plots at Tallulah this year. Although the weevil infestation was heavy at the beginning of the season, the damage was light in most fields because the weevils were held in check by hot, dry weather during the entire fruiting season. In 8 of 33 tests greater yields were made in the untreated than in the calcium-arsenate-treated plots, probably owing to slight variations in soil fertility. The tests were made on 1-acre plots and were replicated 3 times. The special calcium arsenates prepared by the Division of Insecticides did not appear to be better than commercial calcium arsenate. The average gains secured from the special arsenates Nos. 1, 3, 4, and 5 were smaller, and the average gains from Nos. 2 and 6 were slightly larger than from commercial calcium arsenate. The average yields from derris diluted with sulphur to 0.5 and 1.0 percent rotenone indicate that this mixture had little if any value. Phenothiazine mixed 1 to 9 with sulphur gave an increase in yield of 17.5 percent, as compared to 23.7 percent increase in the comparable calcium arsenate plots. The yields from calcium arsenate in which the arsenical content was decreased by diluting with lime and increased by adding 10 and 25 percent paris green all averaged lower than the comparable tests with the straight calcium arsenate. Results from the tests of applying calcium arsenate at 4-, 6-, and 8-day intervals and in the early morning, midday, and late afternoon were not conclusive. The average increase per acre this year for the 33 plots with the regular calcium-arsenate treatment was 153 pounds of seed cotton, or 11.3 percent. The increased yield for the past 16 years has averaged 343 pounds, or 28.8 percent.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection has been continued throughout the month in the regulated areas of Florida and Georgia and in the nonregulated area around Dothan, Ala., where a considerable quantity of seed is shipped. Inspections in the remainder of the nonregulated sections in Alabama, Florida, and Georgia were discontinued about the middle of October. This season over 23,000 bushels of trash was examined in these States, about 6,650 bushels being from the regulated areas. Gin-trash inspection has also gone forward satisfactorily in the regulated portion of the Western Extension of Texas and adjacent territory. About 25 man-days of field inspection was performed in October in the vicinity of the old infested fields in Alachua and Columbia Counties, Fla., and Berrien County, Ga. The material in the fields was sufficient for adequate inspection. The results of all inspections this season have been negative. The only areas where pink bollworms have been found this season are the El Paso Valley of Texas and the Juarez Valley of Mexico, where incidental examinations of trash have been made by regulatory inspectors, and in the Big Bend section of Texas and Mexico.

Field clean-up in Big Bend.--Preparations have been made for cleaning the fields in the Big Bend of Texas again this season. Because of limited funds only the fields showing the largest pink bollworm populations will be cleaned, the expense being borne jointly by the State and Federal Departments. Actual cleaning was begun the first of November and it is believed that all of the fields containing nonpickable cotton will be cleaned before frost.

Road-station inspection.--During October, 13 of the 1,067 cars inspected at the Marfa, Tex., road station were found to be carrying contraband material. Only 1 of the interceptions was infested, this consisting of 22 locks of seed cotton lodged between the body and the cab of a truck. An inspection of this material disclosed two living pink bollworm larvae.

Eradication of Thurberia plants in Arizona.--The remaining equipment for carrying out the eradication of Thurberia plants was received early in October, and the full quota of men immediately put to work. The clean-up is now being carried on in the Tortillita Mountains, located north of Tucson. Estimates are that there are approximately 138,000 acres in this range, and even though several thousand acres are so located that one would hardly expect to find Thurberia plants, it will be necessary to go over the entire acreage sooner or later. Thus far, 13,440 acres have been cleaned and 42,429 plants removed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Insecticide tests against pea aphid.--Reporting on tests conducted from August 16 to September 24, J. E. Dudley, Jr., of the Madison, Wis., laboratory, states that sprays consisting of derris root powder containing 0.0148 percent rotenone in water, applied before the peas became infested, delayed damaging pea aphid infestations for approximately 1 month. Forty-three days after treatment the sprayed vines were in an appreciably better condition than were the untreated vines. Derris dusts containing 0.5 percent of rotenone, applied at the time of original infestation, showed no significant reduction in the final infestation or in foliage condition, as compared to the check plots. Heavy applications of the derris spray, made when the pea aphid infestation was beginning to be apparent, resulted in an excellent control of the aphid from a commercial standpoint for a period of approximately 1 month and the treated vines produced an excellent crop of pods. In one test derris dust containing 0.5 percent of rotenone, applied in the absence of wind, gave excellent control. After the pea vines became heavily infested, the application of derris sprays containing 0.0148 percent rotenone reduced the aphid population approximately 95 percent, in comparison with untreated plots, and resulted in a profitable yield of peas. Derris sprays containing 0.0022 and 0.0011 percent rotenone, respectively, reduced the aphid population approximately 94 percent. Most of the derris sprays were applied with commercially prepared sulphated phenyl phenol (1-600), which functioned as a spreader and wetting agent. In comparative tests with this spreader and wetting agent, sodium lauryl sulphate (1-1,500), and sodium oleyl sulphate (1-600) no significant difference could be determined in the performance of the three materials. Derris sprays without spreaders or wetting agents caused slower but eventually as good reductions in aphid populations as when spreaders and wetting agents were used. Derris dust containing 0.5 percent of rotenone applied in a heavy infestation gave erratic results, inferior to those from the derris sprays.

Status and host plants of three pod borers in Puerto Rico.--L. B. Scott, of the laboratory at Mayaguez, P. R., reports that during October a survey of the entire coast and many of the agricultural areas in the interior of the island was completed. Examinations were made in approximately 150 fields of native beans, all of which were infested by the pod borer *Maruca testulalis* Geyer. The most severe infestations by this pod borer were found in the vicinity of Isabela, on the north shore of the island, where some of the fields were totally destroyed, and in the areas surrounding Yauco on the south shore, where all of the fields examined were damaged. All infestations found thus far in white, red, and lima beans have been confined to *M. testulalis*; however, this insect has not been found in the wild crotalaria (*Crotalaria incana* L.) or in cowpeas (*Vigna unguiculata* (L.) Walp.). Occasionally specimens of *M. testulalis* were found in the "beach" or bay bean (*Canavalia maritima* (Aubl.) Thou.). On several occasions white beans and cowpeas were found growing in adjacent fields with the former infested exclusively by *M. testulalis* and the latter infested exclusively by the lima bean pod borer (*Etiella zinckinella* Treit.). Another species of pod borer, *Fundella cistipennis* Dyar, was found in limited numbers in "sword beans" (*Canavalia ensiformis* (L.) DC.).

Efficiency of insecticides against raspberry fruit worm.--S. E. Crumb and associates, Puyallup, Wash., report the following results obtained in 1935 in tests against *Byturus unicolor* Say on Marlborough and Cuthbert raspberries, loganberries, and youngberries: (1) Best results were obtained by applying a spray consisting of 4 pounds of lead arsenate and 4 pounds of hydrated lime to 100 gallons of water at the peak of beetle emergence, approximately 2 or 3 weeks prior to blossoming, followed by a second application of the same spray just before blossoming, with a third application of a derris root powder spray containing 0.01 percent of rotenone 2 weeks after blossoming. (2) The omission of the first or second spray of lead arsenate decreased the percentage of control. (3) In general, sprays gave better results than dust. (4) The application of a derris root spray containing 0.01 percent of rotenone in the third spray, gave results superior to those obtained by a nicotine sulphate spray(40 percent of nicotine) 1-400. (5) Tests with bentonite and hydrated lime as diluents for lead arsenate indicated that the former was slightly superior in its insecticidal properties to the latter. (6) Applications of zinc arsenite dust to loganberries resulted in severe injury to the plants. (7) Rather severe damage was caused to Marlborough raspberries in one field by the second spray of lead arsenate. (8) Satisfactory results were obtained by substituting barium fluosilicate for lead arsenate at the rate of 4 pounds to 100 gallons of water in the first two sprays.

Small proportion of paris green with lime controls tobacco hornworms.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that in recent experiments for the control of the hornworms Phlegethontius sexta Johan. and P. quinquemaculata Haw., a dust mixture composed of 1 part of paris green and 6 parts of hydrated lime by weight is preferable, from the standpoint of insecticidal efficiency and tolerance of the tobacco plants, to dust mixtures containing these materials in the proportions of 1-4 and 1-5, respectively. The control obtained by the 1-6 mixture was equal to that from lead arsenate and hydrated lime (5-3). These experiments also showed that the applications should be begun in sun-grown tobacco when the infestation reaches an average of 2 or 3 larvae per 100 plants.

INSECTS AFFECTING MAN AND ANIMALS

True screw worm does not breed in cold-blooded animals.--Experiments carried out by E. F. Knipling and B. V. Travis at the Valdosta, Ga., laboratory indicate that Cochliomyia americana Cushing and Patton does not infest wounds in certain cold-blooded animals. Flies placed on wounds in gopher terrapins, alligators, and king snakes refused to oviposit until a piece of cotton saturated with wound discharges from warm-blooded animals was placed near the wound in the reptiles. All newly hatched larvae of the fly placed in the wounds in the reptiles died at the end of the second day without any development.

Flight range of C. americana.--In a series of tests conducted by H. E. Parish at Menard, Tex., to determine the flight range of the true screw worm fly, the greatest distance of travel of this species so far determined is 9 miles. Large numbers of marked flies were released at a certain point and the distance of flight was checked by capturing the marked specimens that came to wounded animals at various distances and directions from the point of liberation of the flies.

Sheep apparently more susceptible to screw worm infestation than goats.--Preliminary experiments being carried on by Messrs. Knipling and Travis, indicate that at certain seasons of the year and under certain conditions wounds in sheep are more attractive to C. americana than are similar wounds in goats.

Pine tar oil a good repellent for Gulf coast tick.--Homer Hixson, of the Valdosta, Ga., laboratory, has found that pine tar oil used alone is effective in keeping ticks Amblyomma maculatum Koch out of the ears of animals for approximately 10 days. The addition of cottonseed oil to the pine tar oil appears to decrease the repellent action of the latter.

Immature stages of Gulf coast tick can survive low temperatures.--C. N. Smith, Washington, D. C., has found that unengorged nymphs and larvae of the Gulf coast tick are able to survive temperatures as low as -4° F. for 24 to 48 hours. Such exposure, however, reduces the proportion of ticks able to successfully engorge.

Beneficial effects of allantoin being confirmed.--The remarkable healing effect of allantoin, a chemical secreted by fly larvae, in the treatment of a wide variety of nonhealing, discharging human wounds is being amply confirmed by doctors throughout the United States. This simple chemical, which was discovered in the secretions of surgical maggots by William Robinson, Washington, D. C., is now being manufactured chemically and used on a large scale, instead of using maggots. Research is being continued to broaden the usefulness of this material and to study its characteristics, also to find other chemicals of a healing nature in maggot secretions. The interest and cooperation of the medical profession in this research is a very valuable factor and is much appreciated.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Six living larvae of the Mexican fruit fly (*Anastrepha ludens* Loew) were taken at New Orleans on September 19 in an orange in quarters from Guatemala, and 14 living larvae of this fruit fly were found at New York on October 4 in an orange in baggage from the same country. These larvae represent our first records of this fruit fly being intercepted from Guatemala. Eight living larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were taken at San Pedro, Calif., on August 8 in a grape in passenger's baggage from Hawaii, the first record in our files of this fruit fly being intercepted in grape from Hawaii. Larvae of the pink bollworm (*Pectinophora gossypiella* Saund.) arrived at Baltimore, Md., on August 18 in seed cotton in the mail from Turkey. Previous interceptions of this insect from Turkey were made in 1924 and 1925. The coccid *Chrysomphalus mimosae* (Comst.) was intercepted at Miami, Fla., on September 27 on hog plum (*Spondias* sp.) in baggage from the Bahamas. A living adult of the nitidulid *Colopterus posticus* Er. was taken at Galveston, Tex., on July 29 with banana debris in cargo from Mexico. Living larvae and pupae of the olethreutid *Zeiraphera ratzeburgiana* Ratz. arrived at Boston on June 27 in spruce tips in the mail from Canada. A living adult of the brenthid *Opisthenoxys ochraceus* Kleine was intercepted at San Francisco on August 20 beneath the bark of a log in cargo from the Philippines. Adults of the bruchid *Bruchus atomarius* Linn. were taken at Washington, D. C., on February 12 in seeds of *Lathyrus montanus* in the mail from Denmark. Two living larvae of *Conotrachelus aguacatae* Barber arrived at Mobile, Ala., on August 22 in the seeds of two avocado fruits in stores from Honduras. This represents the first record in our files of this weevil being intercepted from Honduras. A living larva of the weevil *Cholus cattleyae* Champ. was intercepted at San Juan, P. R., on August 29 in an orchid (*Cattleya* sp.) plant in cargo from Venezuela. A living larva of the cerambycid *Dihammus luxuriosus* Bates was taken at Seattle, Wash., on June 25 in a branch of *Fatsia* sp. in ship's quarters from Japan. A. G. Boving states: "This species, according to Kojima (Jour. Col. Agr. vol. 11 (1931), p. 296), attacks varying kinds of food plants (*Abies*, *Aralia*, *Fatsia*, *Kalopanax*, and *Tilia*), and its mode of attack varies in the different kinds of food plants. The species is of wide distribution in Japan and is injurious." Living specimens of *Thrips validus* Uzel were intercepted at Philadelphia on August 5, 1934, on lettuce leaves in ship's stores from Denmark, and on August 10, 1934, in a cabbage in stores from Belgium. This thrips is not known to occur in the continental United States.

Correction.--In News Letter for September 1, 1935 (vol. 2, no. 9, p. 18) adults of *Euspermophagus gossypii* (Chev.) were found in 1934, not in 1924.

Pathological interceptions of interest.--*Anguillulina pratensis* (de Man) Goffert was intercepted on October 19 at Seattle in a potato from Manchuria, the first interception from that country. *Bacterium citri* (Hasse) Jehle was intercepted at San Pedro on September 28 on sour limes from Japan. *Beauveria globuliferum* (Speg.) Pic. was very much in evidence on a dead insect (Hemiptera) from Mexico, intercepted on September 16 at Galveston, the first interception of the genus. *Chrysomyxa* sp., perhaps *C. chiogenis* Diet., although not listed as occurring on *Vaccineum*, was intercepted at Detroit on October 5 in lingonberries from Newfoundland. *Colletotrichum glycenes* Hori, first interception, was found on soybean pods from Japan on October 12 at Baltimore and *C. pisi* Pat. was intercepted from Cuba for the first time on August 27 on peas at New York. The first interceptions of *Gloeosporium olivarum* were made on August 29 and September 21 on olives from Italy, at New York. The first interception of *G. pelargonii* Cke. and Mass. from Germany was made on September 15 at New York, the host being geranium cuttings in baggage. *Heterosporium echinulatum* (Berk.)Cke. was intercepted on carnations from Mexico for the first time on October 31 at Brownsville, Tex., airport. The first interception of *Phyllachora cynodontis* (Sacc.) Niessl. was made at New York on September 18 on Bermuda grass from Spain. The first interception of *Phyllosticta colocasiae* v. Hoeh. was made on September 30 at New York on *Dieffenbachia seguine* in baggage on S. S. *Haiti*, origin unknown. *Puccinia cynodontis* Lacroix was intercepted from Spain for the first time on September 18 at New York on Bermuda grass. *Sclerotium oryzae* Catt. has been intercepted at New York on rice straw from several countries, mostly new to our interception files, including Australia, Brazil, China (2), India (6), Japan (2), Morocco, Portugal, and South Africa. *Septoria divariceta* E. & E. was intercepted for the first time October 31 at Buffalo on *Phlox paniculata* from Canada. The first interception of *Sphacelotheca cruenta* (Kuehn) Potter from Mexico was made on October 5 at Nogales in broomcorn seed found in a broom.

Larva in soil.--A larva, taken from soil about the roots of some Japanese iris plants brought from Japan by a passenger who arrived at Seattle on October 14, was determined as *Serica* sp.

Garbage cans attractive to inspector.--In inspecting vessels, Inspector Jose A. Ramos, of Philadelphia, finds that the galley, the pantry, and the garbage cans are ideal hunting grounds for prohibited material. As an example, he cites his recent experience on a vessel where the chef was peeling apples. An examination of the refuse en route to the garbage pail revealed the presence of 7 living larvae and 15 living pupae of *Ceratitis capitata* Wied.

Unknown weevil in palm seed.--Weevils were found in a mail shipment of palm seed from the Gold Coast of Africa when inspected at Washington. The specialist reports on these as follows: "This weevil belongs to some genus not represented in the Museum collection and unknown to me. The characters place the species in the vicinity of *Ithyporus*, a genus found in Africa and Madagascar and somewhat allied to our *Conotrachelus*. As far as can be ascertained by an incomplete examination of the literature, the genus is undescribed."

DOMESTIC PLANT QUARANTINES

State quarantine officers witness inspection at Chicago.--A demonstration of actual inspection of packages of plant materials passing through the Chicago Post Office Terminal was given the visiting representatives at the conference of State quarantine officials on November 5. B. M. Gaddis and J. M. Corliss, of the Division of Domestic Plant Quarantines, conducted the 16 officers over a transit inspector's regular tour, and they saw the interception of plants moving to western States without the inspection required under Federal quarantines and without State nursery inspection certificates. Postal officials accompanied the group and showed how postal clerks hold out plant shipments for inspection, and turn back violations to senders when requested to do so. The visitors were also familiarized with the manner of inspecting freight consignments through cooperation of railway agents in providing information through waybills and phone calls on shipments of restricted materials, making it possible to obtain almost 100 percent inspection.

Amendment to Terminal Inspection Act discussed at Eastern Plant Board meeting.--The recent bill proposing to amend the Terminal Inspection Act was explained by Mr. Gaddis at the meeting of the Eastern Plant Board at Baltimore on November 13. The purpose of the proposed amendment is to provide authority to turn back shipments of plant material consigned in violation of State plant quarantines.

More citrus canker infections.--Citrus canker was recently found at Killona, La., in Saint Charles Parish, bordering on the Mississippi River, this being the second parish in the State in which the disease has been found this season. The 650 infected Citrus trifoliata were promptly destroyed by relief workers. The 34th property in the Galveston, Tex., area found infected with citrus canker since the beginning of the calendar year, was recently reported by the supervisor of one of the relief crews destroying abandoned citrus trees. The infection, which appeared on a tree near Alta Loma, was very light. Continued inspections are made in counties bordering on the Galveston area, the counties of Brazoria, Harris, Chambers, Jefferson, Liberty, Hardin, Matagorda, and Galveston having been worked since the first of July. Further inspections in the lower Rio Grande Valley have revealed no canker. Relief workers in the valley have eradicated 1,227,701 citrus trees, principally old abandoned nursery stock. The removal of such growth, it is believed, will be a great aid to orchards in this important citrus-growing area. Thus far in the current year, citrus canker has been found in only 3 of the 21 counties in Texas in which the disease had been located since its outbreak in this State in 1916.

Phony peach relief work.--Over 3,250,000 peach trees have been removed since the early part of August, and over 2,000 workers are now employed under an emergency Federal works project for phony peach disease control, according to Mr. Gaddis, in a talk before a meeting of the Eastern Plant Board at Baltimore on November 13. A brief history of the disease was given, as well as its present status and the proposed activities to be covered by the emergency appropriation act. "Within 2 years after the beginning of the campaign to eradicate the phony peach disease in the heavily infected area of

Georgia and Alabama", Mr. Gaddis stated, "it was found that numerous orchards that had been thoroughly cleaned up were being reinfected from some outside source. Surveys and careful scouting around such plantings brought to light the presence of infected escaped peach trees growing near the orchards. These wild trees were serving as reservoirs of reinfection for the commercial orchards. It is evident, therefore, that the disease cannot be controlled permanently in the orchards unless it is also controlled on its wild hosts. Eradication work in Alabama, Arkansas, Georgia, Illinois, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas will be conducted during the remainder of the fiscal year, at least, and should accomplish much toward effectively controlling the disease and retarding its spread."

Results of phony peach survey in Illinois and Indiana.--State inspectors of Illinois report that the phony peach disease was found in Richland County this season for the first time. Nine counties in Illinois had been found infected, in previous years. In Indiana a cooperative reconnaissance of 18 commercial orchards disclosed no phony peach infections.

Thurberia weevil quarantine violated.--Rarely, if ever, have shipments been found moving in violation of the Thurberia weevil quarantine, which restricts the interstate movement of cotton and other articles from the regulated area in southeastern Arizona. A few cuttings of the cotton plant were, however, recently intercepted at Chicago by State inspector Glenn E. Moore, and turned back to the sender, who, the project leader found, was unaware of the embargo.

Ohio issues blister rust regulations.--Five-leafed pines may be shipped intrastate in Ohio only when grown in Ribes-free zones, under regulations established by the State Director of Agriculture, effective October 15. The zone requirements are similar to those of the Federal quarantine relating to white pine blister rust. Ohio nurserymen growing five-leafed pines in insufficient quantity to establish such zones are required to abandon the growing of this species, and pines purchased for redistribution from premises not Ribes-free must not be held for sale on such premises during the season when the rust is spreading from Ribes to pines. The European black currant is declared a public nuisance. State forests and municipal parks now growing white pines in a sufficient quantity are declared white pine-growing areas, and currant and gooseberry plants may not be grown within 900 feet of them. Control areas may be established for a distance of 900 feet from native or planted white pine areas and for a distance of 1,500 feet from nursery plantings "which have sufficient value to warrant such classification."

BEE CULTURE

Supersedure work under way.--With the appointments of Otto Mackensen as Junior Apiculturist at Baton Rouge, La., and Allen W. Woodrow as Junior Apiculturist at Laramie, Wyo., active work has been begun under the appropriation made by the last Congress for work on the supersedure of queens. In the South a study will be made on the effect on supersedure of various conditions of queen rearing, while in the North a study will be made to determine what conditions within the colony after the queens are introduced affect supersedure. The work on supersedure at Laramie will be under the direct supervision of C. L. Farrar, who has been relieved of some of his former duties through the appointment of Mr. Woodrow. Under the present program, some 200 queens furnished by the southern field laboratory this fall were introduced by Mr. Farrar in colonies of bees in the apiaries of various cooperators in Colorado.

Pollen reserves in northern Colorado are insufficient.--Mr. Farrar reports that, unless an early spring provides pollen for the bees in northern Colorado, the colonies in that territory will probably not be at a favorable strength at the beginning of next year's honey flow.

Washington, D. C., asks for beekeepers' convention.--An effort is being made by officials of the Chamber of Commerce to have the American Honey Producers' League and the American Honey Institute hold their annual convention in Washington in the fall of 1937. Inasmuch as the beekeepers have never met in Washington, considerable interest has been aroused over the prospects of holding their annual convention in this city.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Larvae of rare weevil added to National collections.--A. G. Boving has identified as Agasphaerops nigra Horn specimens of weevil larvae collected from Lilium longiflorum bulbs at Bandon, Oreg., and submitted for identification by C. F. Doucette on October 8. This weevil appears to be a rare species. It was not previously represented, in the larval stage, in the collections of the National Museum.

Another European weevil in North America.--Six specimens, collected by W. W. Baker on June 1, 1935, at Bellingham, Wash., have been identified by L. L. Buchanan as Ceutorhynchus assimilis Paykull, a European species not previously reported from North America. Another specimen of the same species is at hand from Vancouver, British Columbia, having been taken on May 28, 1931, by H. B. Leech. C. assimilis has been called the "cabbage shoot weevil" in Europe, and is reported in European literature as injuring various cruciferous plants.

Additional U. S. distribution records for a European clover weevil.--Specimens of the European Sitona cylindricollis Fahr., a species first discovered in North America in 1932 at Middlebury, Vt., and later at Shelton, Conn., and Lindsay, Ontario, have been identified by L. L. Buchanan from material received recently from Framingham, Mass., and Ottawa, Ontario. W. J. Brown, of the Canadian Department of Agriculture, reports that the species has been present for a number of years in the more southern parts of Ontario and Quebec.

A European parasite of the clover leaf weevil in United States.--The first American occurrence of the ichneumonid Bathyplectes tristis (Grav.), a European parasite of the clover leaf weevil (Hypera punctata Fab.), was recorded when two specimens, reared October 7, 1935, at Arlington Farm, Va., by F. F. Dicke, were identified as that parasite by R. A. Cushman. These specimens came from host material collected on Arlington Farm.

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Japanese parasite of oriental fruit moth established in United States.--Mr. Cushman has recently identified as the ichneumonid *Dioctes molesta* Uchida specimens reared from field-collected material of the oriental fruit moth (*Grapholitha molesta* Busck) from Massachusetts, New York, Virginia, Michigan, Ohio, and Tennessee. This appears to indicate definite establishment in the United States of this parasite which was introduced from Japan to aid in the control of *G. molesta*.

First record of unusual parasite genus in America.--A specimen taken at Philadelphia in banana cargo from Guatemala by Inspector A. B. Wells has been identified by C. F. W. Muesebeck as a new species of the rather remarkable hymenopterous genus *Odontacolus* (family Scelionidae, subfamily Baeinae). This little-known genus of parasites had previously been recorded only from the Australian and oriental zoogeographical regions. The only species for which a host has been recorded is said to be a parasite of spider eggs.

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